

International Journal of Bilingual Education and Bilingualism

ISSN: 1367-0050 (Print) 1747-7522 (Online) Journal homepage: <https://www.tandfonline.com/loi/rbeb20>

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To cite this article: Isa Hendrikx & Kristel Van Goethem (2020): Receptive knowledge of intensifying adjectival compounds: Belgian French-speaking CLIL and non-CLIL learners of Dutch and English, *International Journal of Bilingual Education and Bilingualism*, DOI: [10.1080/13670050.2020.1720592](https://doi.org/10.1080/13670050.2020.1720592)

To link to this article: <https://doi.org/10.1080/13670050.2020.1720592>



Published online: 25 Feb 2020.



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Receptive knowledge of intensifying adjectival compounds: Belgian French-speaking CLIL and non-CLIL learners of Dutch and English

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ABSTRACT

Languages differ in their preferences for particular intensifying constructions. While intensifying adjectival compounds (IACs) (e.g. *ijskoud*, *ice-cold*) are productively used to express intensification in Dutch and English, in French this construction is hardly productive. Consequently, French-speaking learners may encounter difficulties acquiring IACs in Dutch/English. As part of a research project on CLIL in French-speaking Belgium, we explore the effect of CLIL on the acquisition of IACs in the target language (TL) Dutch/English through a multiple-choice test. The results confirm that CLIL students (learning English/Dutch) develop greater receptive knowledge of these constructions. Furthermore, the more frequent IACs are more likely to be recognized by the learners. Moreover, even when the CLIL effect is considered alongside other factors, such as the students' extracurricular exposure to the TL and their overall vocabulary, CLIL is still an important predictor of the learners' receptive knowledge of English IACs, in addition to productive and receptive vocabulary. By contrast, current informal contact with the TL and receptive vocabulary are significant predictors of learners' receptive knowledge of Dutch IACs, but CLIL does not significantly contribute to the regression model for the latter language.

ARTICLE HISTORY

Received 6 March 2019

Accepted 8 January 2020

KEYWORDS

Intensifying adjectival compounds; acquisition of L2 Dutch and L2 English; French-speaking learners; Content and Language Integrated Learning (CLIL); receptive and productive vocabulary; target language exposure

1. Introduction

Belgium is internationally known as a multilingual country, comprising three official languages (Dutch, French, and German) and four language areas: the Dutch-speaking area (Flanders), the French-speaking area (Wallonia), the Dutch-French bilingual region of Brussels-Capital, and the German-speaking area. Good language skills are highly valued in Belgium, specifically in the job market (Mettewie and Van Mensel 2009). Nevertheless, recent research conducted by the European Union indicates that foreign language teaching and learning in Belgium is on a downward spiral (Eurostat 2016).

The pedagogical approach of Content and Language Integrated Learning (CLIL) has been promoted by the European Union to enhance widespread multilingualism (Coyle, Hood, and Marsh 2010). In CLIL, several school subjects (e.g. history, geography, science, and mathematics) are taught in a language other than the students' L1 (Blondin 2003; Chohey-Paquet 2008; Hiligsmann et al. 2017). In order to gain a more complete view of the impact of CLIL on learning foreign languages (Dutch and English) in French-speaking Belgium, a multidisciplinary team of researchers from the Université catholique de Louvain and the Université de Namur conducted a joint

research project (2014–2019) exploring linguistic, cognitive, educational, and socio-affective avenues of research (Hilgsmann et al. 2017).¹

In this study, we focus on the acquisition of Dutch and English intensifying adjectival compound constructions (IACs) by French-speaking students enrolled in CLIL, or receiving traditional second/foreign language instruction. Such constructions include an upscaling or amplifying modifier, which strengthens the meaning of the adjective (such as *ice-cold*, *brand-new*, *crystal clear*) and are also known as ‘elative compounds’ (Hoeksema 2012; Rainer 2015). Intensifiers and language-specific intensifying patterns are not always explicitly taught, as is the case for phraseology in general (Meunier 2012). Consequently, the acquisition of intensifiers may largely depend on implicit learning, and the amount of TL exposure may be key to a target-like acquisition. For this reason, the acquisition of IACs may form an appropriate test bed to analyze implicit language learning in CLIL, as opposed to explicit language learning (instructed TL acquisition).

Our research takes a usage-based approach. From this perspective, it is claimed that spoken and written language emerges through input and use (Ellis 2002, 2008). Based on these assumptions, the additional TL exposure through CLIL may be expected to foster a better acquisition of TL constructions. More specifically, the French-speaking Belgian CLIL students are taught in the TL between 8 and 13 h per week (including the foreign language class), in contrast to the non-CLIL students, who take only 4 h of foreign language classes per week (for more information on the sample, see Section 4.1.). Note that no official selection to enroll in CLIL is allowed in French-speaking Belgium.² Moreover, in French-speaking Belgium there are no extra official requirements for CLIL teachers in comparison to non-CLIL teachers.

In practical terms, this article presents the results of a multiple-choice test, which is used to assess the learners’ receptive knowledge of IACs. Additionally, the test results will be related to the learners’ general receptive and productive vocabulary knowledge. Besides the impact of CLIL, the effects of extracurricular exposure and duration of TL learning will also be taken into account.³

In the next sections, we first discuss the literature on the linguistic outcomes of CLIL in French-speaking Belgium, and consider the importance of potential confounding variables, i.e. informal/formal TL exposure and overall vocabulary knowledge (Section 2). Subsequently, we introduce our specific research questions and hypotheses (Section 3). Thereafter, we present the participants, the data collection and the test materials (Section 4). Finally, we present and discuss the results (Section 5), and we wrap up with a brief conclusion (Section 6).

2. The CLIL effect and interfering variables

2.1. Previous research on vocabulary acquisition in CLIL in French-speaking Belgium

In studies assessing target language (TL) proficiency in CLIL settings, lexicon often receives pride of place (Ruiz de Zarobe 2011, 135). This is probably due to the fact that the content-based approach typical of CLIL provides more opportunities to learn TL vocabulary in meaningful situations (Dalton-Puffer 2011, 186). Previous studies reported that CLIL students use a more diverse and more complex vocabulary, adapted to the context (Zydatiś 2007; Jexenflcker and Dalton-Puffer 2010; Lo Yuen and Murphy 2010; Ruiz de Zarobe 2010; Merikivi and Pietilä 2014; Surmont et al. 2014; Gorjian and Hamidavi 2017). However, various theoretical approaches concur in underscoring the prefabricated and formulaic nature of language (Wray 2002; Fiedler 2007; Wood 2010). In their view, language consists of ‘chunks’, and lexis and grammar interface in producing conventionalized form-meaning pairings or ‘constructions’ (cf. Hoffmann and Trousdale 2013). In other words, TL vocabulary knowledge involves the acquisition of not only simplex words, but also complex lexemes and collocations in which the combination of the components is often subject to specific restrictions (e.g. *ice-cold* but not **snow-cold*). Since we are analyzing the collocation of an intensifying element with an

adjective within IACs, this study can be considered a case study of the phraseological competence of learners of Dutch or English as a TL, enrolled in CLIL or in traditional TL education in French-speaking Belgium.

While aiming to identify the effect of CLIL on the acquisition of IACs, we need to control for other variables that may affect the outcome variable. In the remainder of this section, we will discuss the potential role of other types of formal and informal TL exposure (2.2), and the possible effect of overall vocabulary knowledge on the acquisition of IACs (2.3).

2.2. Formal and informal target language exposure

As put forth in Muñoz (2014) and Van Mensel et al. (forthcoming), TL exposure can refer to either formal or informal exposure. Formal input consists of TL instruction, often measured in number of years of instruction. Informal input denotes extracurricular contact with the TL, such as conversations with L1 speakers, watching television or reading books in the TL, or using the TL on the Internet.

Recent research shows that exposure time is an important indicator of TL proficiency outcomes (Lambelet and Berthele 2015). Duration of exposure to the TL is found to have a positive effect on receptive vocabulary, for instance (Golberg, Paradis, and Crago 2008; Terrazas Gallego and Agustín Llach 2009). However, to our knowledge, the receptive knowledge of intensifiers in a TL (and the effect of the duration of TL instruction on the acquisition of IACs) has not yet been studied. In order to avoid confusing the effect of CLIL with the effect of the duration of TL instruction, it is vital to control for this variable in our study.

Regarding extracurricular TL exposure, it has been demonstrated that contact with L1 speakers is positively related to language learning, and all the more so in informal than in formal contexts (Kinsella 2009; Moyer 2009). Llanes and Muñoz (2009) and Pérez-Vidal and Juan-Garau (2011) found linguistic gains (in fluency, accuracy, and listening comprehension, among others) related to a study-abroad experience, for instance. Furthermore, Muñoz (2011) found that both recent and current exposure to language input (at home and abroad), as well as length of instructed exposure, correlated significantly with proficiency scores. Along the same lines, Sylvén and Ohlander (2014, 99) claim that 'students' extramural English (EE) activities (i.e. activities performed through the medium of English in students' spare time, outside of school) are of crucial importance' for TL acquisition (see also Sundqvist 2009; Olsson 2011; Sylvén and Sundqvist 2012). These findings indicate that different types of TL exposure affect various components of TL acquisition and proficiency.

However, CLIL studies that have controlled for potential effects of extracurricular TL exposure are scarce. One example is Saladríguez and Llanes's (2014) study, in which the participating students were grouped according to not only the program to which they belonged (CLIL or non-CLIL) but also their degree of TL exposure. While the CLIL and the non-CLIL students did not perform in a significantly different manner with respect to written fluency, accuracy, lexical complexity, and syntactic complexity, the high TL exposure group did significantly outperform the low TL exposure group. We expect that young learners may frequently encounter intensification outside the classroom, and that extracurricular contact with the target language may have an impact on their acquisition of IACs.

2.3. Relationship between overall vocabulary knowledge and acquisition of collocations

In addition to analyzing the effect of different types of TL exposure on the learners' receptive knowledge of IACs, we will also assess the relationship between vocabulary knowledge (both receptive and productive) and our outcome variable.

Receptive knowledge of intensifying constructions, and of IACs in particular, can be thought of as a rather specific type of vocabulary knowledge. The field that comes closest to assessing this issue may be Second Language Acquisition (SLA) research on collocational proficiency. Collocations are conventionalized, frequently recurring word combinations (Gyllstad 2007). IACs such as *brand-new* and

crystal clear can be considered a specific type of morphological collocation. In this study, we assess whether the CLIL learners have a broader receptive knowledge of these IACs.

Previous studies that focused on the acquisition of collocations in a TL reported results that appear to be contradictory. For instance, in his research on the relationship between receptive collocation knowledge, vocabulary size, and learning level of advanced Swedish learners of English, Gyllstad (2007) observed that the learners' vocabulary size and their receptive collocation knowledge were closely related. Koya (2005) also reported a significant relationship between general vocabulary knowledge and knowledge of collocations among 130 Japanese university-level English as a Foreign Language (EFL) students. However, Arnaud and Savignon (1997) demonstrated that even at high levels of proficiency, collocation proficiency could fall behind. They analyzed vocabulary knowledge and knowledge of complex idioms among advanced learners (L1 French), teacher trainees, and secondary school EFL teachers. Their findings showed that although the experienced EFL teachers had equal knowledge of low-frequency words as compared with native speakers, the secondary school teachers did not reach a native-like level in their knowledge of complex idioms. Similarly, Bahns and Eldaw (1993) report that the 58 advanced EFL learners (L1 German) in their study had difficulty carrying out a translation task and a cloze task on English verb-noun collocations. While collocates consisted of less than a quarter of all lexical words, more than half of the erroneously translated lexical items were collocates. In the cloze task, the learners also made numerous errors. Thus, whereas some studies find a strong positive association between vocabulary knowledge and collocational knowledge (Koya 2005; Gyllstad 2007), others conclude that learners encounter more difficulties in acquiring collocations than single lexical items (Bahns and Eldaw 1993; Arnaud and Savignon 1997).⁴

3. Research hypotheses

In this study, we assess whether the CLIL learners have a broader receptive knowledge of IACs than their peers in traditional second/foreign language instruction, while controlling for the variables introduced in the previous section. Specifically, we address the following hypotheses:

- (i) We expect that, overall, CLIL students will score higher in the multiple-choice test on IACs compared with their peers in the non-CLIL track, because of their additional TL input in the CLIL setting.
- (ii) We hypothesize that the more frequently an intensifying compound occurs in a reference corpus (and hypothetically in the TL input of the learners), the more learners will recognize the compound in the multiple-choice test.
- (iii) We expect that exposure to the TL through extracurricular TL input and/or the duration of TL learning will have a positive effect on the learners' receptive knowledge of IACs.
- (iv) We expect to find a greater receptive knowledge of IACs if a learner has an overall well-developed productive and receptive vocabulary.

In what follows, we first provide more information about the learners who took part in the test, the procedure, the test materials, and questionnaires (in Section 4), before discussing the results (in Section 5).

4. Methods

4.1. Participants

Our sample consists of French-speaking secondary school students (twelfth grade, aged 17–19), in CLIL and non-CLIL settings, learning Dutch or English, from nine different secondary schools in French-speaking Belgium. The schools in the sample have contrasting profiles, in terms of geographical location (all provinces of French-speaking Belgium are covered), CLIL type (early vs. late), education authority (official education and publicly-subsidized schools), and socio-economic level. The non-

Table 1. Sample.

		Dutch (195)		English (150)	
		Non-CLIL (69)	CLIL (126)	Non-CLIL (68)	CLIL (82)
Gender	Female	37	57	46	44
		53.6%	45.2%	67.6%	53.7%
	Male	32	69	22	38
		46.4%	54.8%	32.4%	46.3%
Home language	Only French outside school	51	103	48	50
		73.9%	81.7%	70.6%	61%
	Sometimes another language outside school	17	19	18	21
		24.6%	15.1%	26.5%	25.6%
	Mostly another language outside school	1	4	2	11
		1.4%	3.2%	2.9%	13.4%
Mean age		18.16	17.87	18.16	18.10

CLIL students in the sample are enrolled in the same schools as the CLIL students, but in the non-CLIL track. The so-called social index of the participating schools, providing a rough indication of the school population's socio-economic background, ranges (on a scale of 1–20) from 6 to 20 (mean 12.8, median 11).⁵ We did not test the students' CEFR level, but the PVVT scores (cf. Section 4.3.2.2.) give an indication of their receptive vocabulary. For more information on their overall written proficiency, we refer to Bulon et al. (2017) and Van Mensel et al. (forthcoming). These studies showed different results according to the target language: the Dutch CLIL students outperformed the non-CLIL students with respect to lexical diversity and lexical and syntactic complexity, while the English CLIL students outperformed the non-CLIL students only with respect to lexical diversity and syntactic complexity. For further details about the participants in the study, see Van Mensel et al. (2019) and Hiligsmann et al. (2017) (Table 1).

4.2. Procedure

Data collection took place at the Université catholique de Louvain in spring 2017. The learners completed the exercise and the questionnaires in the online software LimeSurvey.⁶ There was no time limit. The participants were not allowed to surf the Internet and could not use dictionaries or other reference tools.

4.3. Test materials

4.3.1. Multiple-choice test

The multiple-choice exercise developed to examine the learners' receptive knowledge of IACs consisted of ten short sentences with a blank for an appropriate intensifying element. Below each sentence, three options were available to fill in the blank. Both the sentences and the answer options were presented to the students in a random order. One of the answer options was idiomatic, while the other two were not. Examples of blank sentences in the multiple-choice exercise in Dutch and in English are presented in (1) and (2) (see Appendix A1 for the complete exercise in English and in Dutch):

- (1) *De soep is ... heet.* 'The soup is ... hot.'
 - *steen* 'stone'
 - *bloed* 'blood'
 - *pik* 'pitch'
- (2) *He was ... drunk and behaved really badly.*
 - *blind*
 - *fast*
 - *rock*

Tables 2 and 3 present the intensifying compounds included in the multiple-choice test. The grey shades in the table indicate the idiomatic combinations. The compounds were selected based on the following criteria: formality, frequency, and semantic transparency. Based on a random selection of intensifying compounds, a sub-selection was made, including:

- both formal (e.g. *crystal clear*, *paper-thin* and *beeldschoon* 'lit. image-beautiful') and informal compounds (e.g. *blind drunk*, *dead easy* and *bloedheet* 'lit. blood-hot');
- both frequent (e.g. *brand-new*, *keihard* 'lit. boulder-hard') and infrequent compounds (e.g. *crystal clear*, *paper-thin* and *beresterk* 'lit. bear-strong');
- both semantically transparent (e.g. *ice-cold*, *soaking wet*, *crystal clear*, *worldwide*, *paper-thin*, *razor-sharp*, *keihard* 'lit. boulder-hard', *pijlsnel* 'lit. arrow-fast', *schatrijk* 'lit. treasure-rich', *beresterk* 'lit. bear-strong', and *muisstil* 'lit. mouse-quiet'), and semantically non-transparent compounds (e.g. *brand-new*, *blind drunk*, *wide awake*, *dead easy*, *stokoud* 'lit. stick-old', *bloedheet* 'lit. blood-hot', *spekglad* 'lit. fat-slippery', *peperduur* 'lit. pepper-expensive' and *beeldschoon* 'lit. image-beautiful').

In Tables 2 and 3, the compounds are presented with their normalized frequency in a reference corpus, and with an indication of their semantic transparency. As reference corpus, we used the Leipzig English web text corpus, containing 926,766,504 words⁷, and the Leipzig Dutch web text corpus, containing 337,800,733 words⁸, both based on material from 2002.⁹ As shown in the tables, the normalized frequencies (per 100,000 words) of the idiomatic compounds differ from item to item, ranging between 0.004 (*crystal clear* and *paper-thin*) and 1.207 (*brand-new*) in English, and between 0.024 (*beresterk*) and 1.333 (*keihard*) in Dutch.

Table 2. Items in the multiple-choice test on English IACs.

1	Normalized frequency (per 100,000 words ref. corpus) ¹⁵	<i>ice</i> 0.030	<i>stone</i> 0.000	<i>frost</i> 0.000	cold
2	Transparency	+			
3	Normalized frequency	<i>brand</i> 1.207	<i>pitch</i> 0.000	<i>stock</i> 0.000	new
4	Transparency	—			
5	Normalized frequency	<i>stark</i> 0.000	<i>pouring</i> 0.000	<i>soaking</i> 0.047	wet
6	Transparency			+	
7	Normalized frequency	<i>dead</i> 0.000	<i>crystal</i> 0.004	<i>mirror</i> 0.000	clear
8	Transparency		+		
9	Normalized frequency	<i>world</i> 1.023	<i>brand</i> 0.000	<i>country</i> 0.000 ^a	wide
10	Transparency	+			
11	Normalized frequency	<i>blind</i> 0.006	<i>fast</i> 0.000	<i>rock</i> 0.000	drunk
12	Transparency	—			
13	Normalized frequency	<i>sheet</i> 0.000	<i>dead</i> 0.000	<i>paper</i> 0.004	thin
14	Transparency			+	
15	Normalized frequency	<i>razor</i> 0.081	<i>blade</i> 0.000	<i>pitch</i> 0.000	sharp
16	Transparency	+			
17	Normalized frequency	<i>dirt</i> 0.000	<i>wide</i> 0.025	<i>rock</i> 0.000	awake
18	Transparency		—		
19	Normalized frequency	<i>dead</i> 0.009	<i>bone</i> 0.000	<i>crystal</i> 0.000	easy
20	Transparency	—			

^a*Country-wide* occurs 34 times in the corpus (normalized frequency 0.000366867). The other IACs with a normalized frequency of 0.000 do not occur at all in the reference corpora.

Table 3. Items in the multiple-choice test on Dutch IACs.

1		<i>stok</i> 'stick'	<i>piep</i> 'beep'	<i>steen</i> 'stone'	<i>oud</i> 'old'
	Normalized frequency (per 100,000 words ref. corpus)	0.071	0.000	0.000	
	Transparency	—			
2		<i>steen</i> 'stone'	<i>bloed</i> 'blood'	<i>pik</i> 'pitch'	<i>heet</i> 'hot'
	Normalized frequency	0.000	0.116	0.000	
	Transparency		—		
3		<i>stok</i> 'stick'	<i>ijs</i> 'ice'	<i>spek</i> 'fat'	<i>glad</i> 'slippery'
	Normalized frequency	0.000	0.000	0.054	
	Transparency			—	
4		<i>kei</i> 'boulder'	<i>gloeïend</i> 'glowing'	<i>oer</i> 'primal'	<i>hard</i> 'hard'
	Normalized frequency	1.333	0.000	0.000	
	Transparency	+			
5		<i>spiksplinter</i> 'spike-splinter'	<i>laaiend</i> 'furiously'	<i>peper</i> 'pepper'	<i>duur</i> 'expensive'
	Normalized frequency	0.000	0.000	0.140	
	Transparency			—	
6		<i>aal</i> 'eel'	<i>muis</i> 'mouse'	<i>snik</i> 'sob'	<i>stil</i> 'quiet'
	Normalized frequency	0.000	0.090	0.000	
	Transparency		+		
7		<i>ei</i> 'egg'	<i>toren</i> 'tower'	<i>pijl</i> 'arrow'	<i>snel</i> 'fast'
	Normalized frequency	0.000	0.000	0.044	
	Transparency			+	
8		<i>roet</i> 'soot'	<i>schat</i> 'treasure'	<i>honds</i> 'dog'	<i>rijk</i> 'rich'
	Normalized frequency	0.000	0.060	0.000	
	Transparency		+		
9		<i>spuug</i> 'spit'	<i>barstens</i> 'bursting'	<i>bere</i> 'bear'	<i>sterk</i> 'strong'
	Normalized frequency	0.000	0.000	0.024	
	Transparency			+	
10		<i>beeld</i> 'image'	<i>ziels</i> 'soul'	<i>ape</i> 'ape'	<i>schoon</i> 'beautiful'
	Normalized frequency	0.124	0.000	0.000	
	Transparency	—			

While it is rather difficult to make assumptions about the quality of the target-language input that the learners receive¹⁰ – among others because they are exposed to both formal and informal input, see Section 2.2. – we consider the normalized frequency in the reference corpus a proxy for the relative comparative frequency with which the compounds occur in the TL input of the learners. Caution is needed, of course, as the reference corpus is not exactly representative of learner input. However, given that the size of the reference corpus is significant, it is expected to be generally informative of the comparative frequency of the compounds. The relationship between the frequency of the compound in the reference corpus and the number of learners that are able to identify it in the multiple-choice test will be considered in the results section (Section 5).

The distractors included in the test are elements that occur in intensifying compounds, and are therefore plausible elements to form an intensifying compound. We checked in dictionaries and reference corpora whether the two distractors formed an unidiomatic combination. Among the distractors, only *stone-cold* is a combination that occurs, but much less frequently than the targeted item *ice-cold*. In Section 5, we will investigate the possible influence of the distractors on the learners' choices in terms of their semantic transparency and their possible semantic compatibility with the adjective.

For each student, we calculated a score that represented the proportion of idiomatic choices: we divided the number of idiomatic choices by the total number of items (10), resulting in a one-decimal score between 0 and 1 per learner.

4.3.2. Measures of target-language exposure and vocabulary knowledge

The input measures (besides CLIL) used to investigate the potential impact of TL input on the learners' receptive knowledge of IACs are based on Muñoz's work (2011, 2014) and are derived from student questionnaires.

4.3.2.1. Measures of target-language exposure

4.3.2.1.1. Duration of target-language teaching. Table 4 shows that the TL Dutch learners (both in CLIL and in non-CLIL) benefitted from more years of TL instruction than the TL English learners on average. Furthermore, both in TL Dutch and in TL English, we observe that CLIL students had been taught the TL for more years compared with their peers in traditional foreign language instruction. In Dutch, this difference between CLIL and non-CLIL students is significant ($U = 4569.5$, $z = -4.6$, $p < 0.05$, $r = -0.30$; medium effect size). In Sections 5.2 and 5.3, we examine whether these extra years of TL instruction are significantly related to the learners' receptive knowledge of IACs, and, if so, whether the effect of CLIL would remain present when we isolated it from the number of years of TL instruction.

Table 4. Number of years of TL instruction.

	English		Dutch	
	Non-CLIL	CLIL	Non-CLIL	CLIL
<i>n</i>	96	96	103	135
Mean	5.00	6.23	7.73	9.30
St. dev.	2.20	3.01	2.48	2.53

4.3.2.1.2. Extracurricular target-language exposure. Another type of TL exposure that should be controlled for is extracurricular TL input (Muñoz 2011, 2014). The measure of frequency of current informal contact with the TL used in this study is a composite measure consisting of frequency of Internet use in the TL, frequency of TL use (both productive and receptive) outside school, and frequency of contact with L1 speakers outside school. The measure (Cronbach's alpha .78) is based on the following items from the questionnaires administered to our sample of students; the students replied on a scale of 1–5 (never – rarely – sometimes – often – very often):

[Original in French]

- Sur internet, à quelle fréquence utilises-tu l'anglais / le néerlandais?
- A quelle fréquence parles-tu l'anglais / le néerlandais en dehors de l'école?
- A quelle fréquence entends-tu l'anglais / le néerlandais en dehors de l'école?
- As-tu des contacts avec des anglophones / des néerlandophones en dehors de l'école ou de la maison?

[English translation]

- How often do you use English/Dutch on the Internet?
- How often do you speak English/Dutch outside school?
- How often do you hear English/Dutch outside school?
- Do you have any contact with English-speakers/Dutch-speakers outside school or home?

Table 5 summarizes the results obtained for this measure. Overall, we observe that the non-CLIL Dutch learners have least informal contact with the TL, followed by the CLIL Dutch learners. This may seem rather surprising, since Dutch is a national language in Belgium. Possibly this is due to the fact that, in Belgium, English is regarded as the most important international

Table 5. Extracurricular TL input.

	English		Dutch	
	Non-CLIL	CLIL	Non-CLIL	CLIL
<i>n</i>	100	100	108	137
Mean	3.02	3.42	2.05	2.54
St. dev.	0.09	0.08	0.07	0.07

language and is omnipresent in daily life (music, social media, etc.). In both TLs, CLIL students have significantly more informal contact with the TL compared with non-CLIL students (English $U = 3455.0$, $z = -2.9$, $p < 0.05$, $r = -0.21$; Dutch $U = 4386.0$, $z = -4.3$, $p < 0.05$, $r = -0.27$; note, however, the small effect sizes).

4.3.2.2. Measures of productive and receptive vocabulary knowledge

In addition to analyzing the relationship between the different types of TL exposure and the learners' receptive knowledge of IACs, we also assessed the relationship between vocabulary knowledge (both receptive and productive) and the learners' receptive knowledge of IACs.

In this study, the measures of productive and receptive vocabulary knowledge were developed as follows. Besides the multiple-choice test, the participating students were also invited to write an e-mail to a friend, telling them about a party they had been to or about their holiday (15–25 lines). These written materials were used to calculate various measures of written proficiency (Bulon et al. 2017). We used the MTLD (Measure of Textual Linguistic Diversity) calculated on the learners' written productions as a proxy for productive TL vocabulary knowledge. MTLD is calculated as the 'mean length of sequential word strings in a text that maintain a given TTR value' (McCarthy and Jarvis 2010, 385).¹¹ To calculate the MTLD for the English texts, we used Coh-Metrix (Graesser et al. 2004); for the Dutch texts, we used T-Scan (Pander Maat et al. 2014).

As a measure of receptive vocabulary knowledge in English, we used the Peabody Picture Vocabulary Test, Fourth Edition (PPVT-IV) (Dunn and Dunn 1997). This is an untimed test of receptive vocabulary for Standard American English. During this test, the participant gets to see four pictures at once, while listening to a single word spoken by the examiner. In our case, the word was recorded; the students wore headphones and could play back the word as often as they needed to choose the image that depicted the word. For Dutch, we used the Peabody Picture Vocabulary Test-III-NL (PPVT-III-NL), which works in a similar way, but applies to Dutch (Schlichting 2005) (see also Simonis et al. (forthcoming b)).

Table 6 shows an overview of the descriptive statistics for the measures of productive and receptive vocabulary, broken down according to the two TL conditions.

We can see from Table 6 that, on average, the CLIL students' productive vocabulary (MTLD) is significantly larger than the productive vocabulary of the non-CLIL students (English: $U = 1668.0$, $z = -4.1$, $p < 0.05$, $r = -0.32$; Dutch: $U = 1880.0$, $z = -6.7$, $p < 0.05$, $r = -0.48$; medium effect sizes). Furthermore, compared with their peers in traditional TL instruction, the CLIL students also obtained higher scores in the receptive vocabulary test (PPVT-IV/ PPVT-III-N) (English: $U = 1272.5$, $z = -8.0$, $p < 0.05$, $r = -0.62$; Dutch: $U = 1902.5$, $z = -9.1$, $p < 0.05$, $r = -0.61$; note the large effect sizes).

Table 6. Productive and receptive vocabulary knowledge.

		English		Dutch	
		Non-CLIL	CLIL	Non-CLIL	CLIL
MTLD based on written TL productions	<i>n</i>	82	84	80	133
	Mean	65.63	78.42	64.36	83.06
	St. dev.	2.22	1.93	2.10	1.72
Receptive vocabulary knowledge based on PPVT-IV/ PPVT-III-NL	<i>n</i>	74	90	95	130
	Mean	109.11	148.28	91.96	128.28
	St. dev.	32.41	29.03	30.29	20.48

Finally, we also examined two control variables: the socio-economic status and non-verbal intelligence of the students, but found no correlations between non-verbal intelligence (Raven score) or socio-economic status and our dependent variable (receptive knowledge of IACs). Hence, it is unlikely that our results are biased by these two variables, and they will not be taken into account in the remainder of this study.

5. Results of the multiple-choice exercise

In this section, we explore the results of the multiple-choice exercises in English and Dutch separately.

5.1. Proportion of idiomatic choices

5.1.1. English

First, we compare the proportions of idiomatic choices in the multiple-choice test, per condition (CLIL/non-CLIL). Table 7 shows the descriptive statistics. Significantly more students in English CLIL were able to identify most of the IACs, in comparison with the non-CLIL students ($U = 1722.0$, $z = -6.03$, $p > .05$, $r = -0.46$; medium effect size).

In the histograms in Figure 1, the data from the non-CLIL students are presented above the data from the CLIL students. The horizontal axis depicts the proportions of idiomatic choices, on a scale of 0–1 (1 indicating that the student scored 100%). The vertical axis shows the number of students (who obtained a particular score). From this we can see, for instance, that 19 non-CLIL students identified 6 out of 10 IACs, and that 24 CLIL students identified 9 out of 10 IACs. The scores of the non-CLIL students are more spread out, while the histogram representing the results of the CLIL students shows that the largest proportions of students score within the range of 60% to 90%.

In what follows, we discuss the IACs that turned to be particularly easy or difficult to identify.

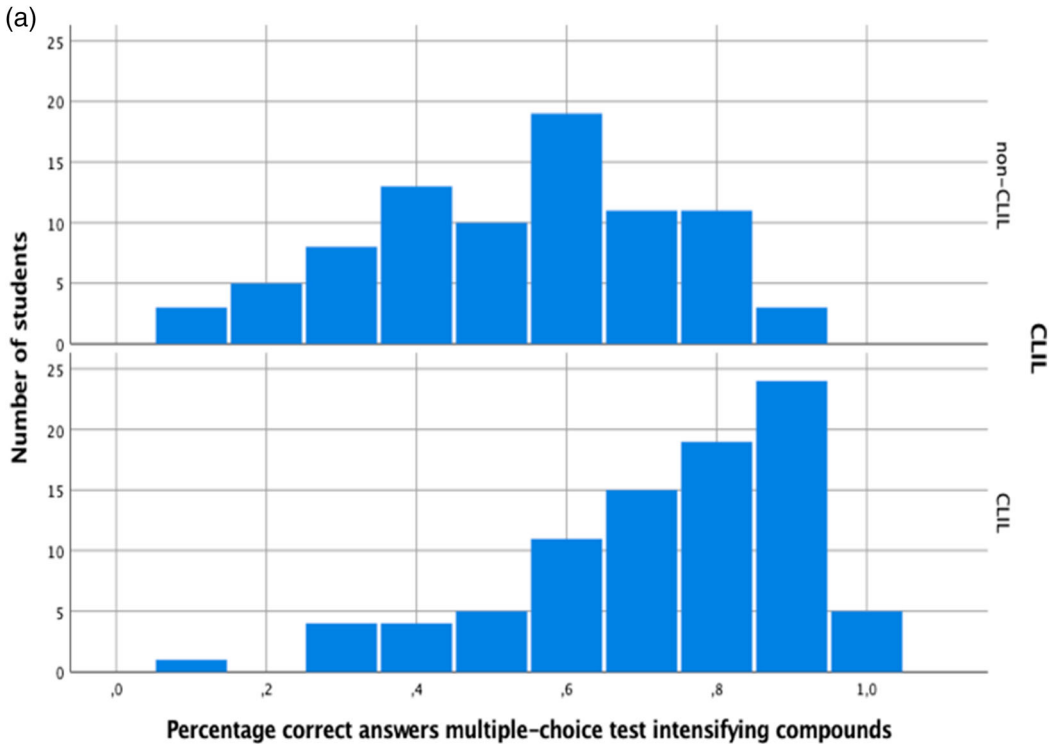
Of all intensifying compounds under study, the intensifying compound *brand-new* is the item that the CLIL learners identified most frequently (95.35%). For the non-CLIL students, it is the second most frequently identified item (68.42%). Although *brand-new* is not semantically transparent, most learners recognized this intensifying compound anyway. One explanation for its relative ‘easiness’ may involve the distractors (*pitch* and *stock*), which would not form semantically transparent compounds with *new* either. It is therefore probable that they did not add an extra layer of difficulty. Moreover, the frequency of *brand-new* may be an important part of the explanation as well: of all compounds included in the test, *brand-new* occurs most frequently in the English web text corpus (namely 111,881 times, or 1.207 per million words), and is probably a relatively frequent compound in the learners’ input as well.

The compound *worldwide* is the second ‘easiest’ compound for the CLIL learners, since 90.59% of the CLIL students identified it and 66.67% of the non-CLIL students. The distractor *country* might have been expected to complicate the learners’ choice, as *country* would also form a semantically coherent compound together with *wide*. Possibly its semantic transparency and its frequency (it is the second most frequent compound of the items under study, occurring 94,791 times in the web text corpus, or 1,023 per million words) may explain why most of the learners chose *worldwide* over *country wide* or *brand wide*.

The compounds *dead easy* and *blind drunk* are more difficult for the learners: 74.71% of the CLIL learners and only 37.97% of the non-CLIL learners identified *dead easy* correctly; only 47.13% of the CLIL learners and 34.18% of the non-CLIL learners identified *blind drunk* correctly. The difficulty may be due to the informal nature of these compounds – they can be expected to occur even less frequently in the teaching materials than the other intensifying compounds. *Dead easy* and *blind drunk* are rather infrequent in the reference corpus (806 occurrences, or a normalized frequency of 0.009 per million words, and 545 occurrences, or 0.006 per million words respectively). The learners’ choice may have been rendered even more difficult due to the semantic opacity of the compounds. Note, moreover, that in the case of these two compounds we can observe a clear discrepancy

Table 7. Descriptive statistics of the proportion of idiomatic choices in the English multiple-choice test – based on individual proportions.

	Non-CLIL English	CLIL English
<i>n</i>	83	88
Mean	0.54	0.73
Median	0.6	0.8
St. dev.	0.20	0.19

**Figure 1.** Proportion of idiomatic choices in the multiple-choice test on English compounds.

between the non-CLIL and the CLIL students. While the majority of the CLIL students correctly picked out the most idiomatic answer options, most of the non-CLIL learners thought the most idiomatic combinations were *bone easy* instead of *dead easy* and *fast drunk* instead of *blind drunk*. In the latter case, the learners may have interpreted the sentence as ‘He was rapidly drunk and behaved really badly’ instead of ‘He was very drunk and behaved really badly’.

Finally, while the compound *ice-cold* is not infrequent in the reference corpus (0.030 per million words) and is semantically transparent, only 60.23% of the CLIL learners and 46.91% of the non-CLIL learners picked this combination, possibly due to the tricky multiple-choice option *frost cold*. Moreover, *stone-cold* is, just like *ice-cold* an acceptable combination (but is used much less frequently than *ice-cold*). In all, 25.93% of the non-CLIL students and 20.45% of the CLIL students managed to identify this combination. In other words, it is likely that the distractors explain the small proportion of students that selected the most idiomatic combination.

In addition to the fact that students in CLIL picked out the idiomatic combination more frequently compared with the non-CLIL students (Tables 7 and 8), the frequency of the compound also appears to play a role in the learners’ ease in recognizing it. Using a Spearman’s rank correlation coefficient that was calculated based on the number of idiomatic choices (idiomatic = 1, not idiomatic = 0) and

Table 8. Proportions of idiomatic choices per item in the English multiple-choice test – based on group proportions.

		Non-CLIL			CLIL			
<i>n</i>		81			88			
1		<i>ice</i>	<i>stone</i>	<i>frost</i>	<i>ice</i>	<i>stone</i>	<i>frost</i>	cold
	no. students	38	21	22	53	18	17	
	percentage	46.91%	25.93%	27.16%	60.23%	20.45%	19.32%	
2		<i>brand</i>	<i>pitch</i>	<i>stock</i>	<i>brand</i>	<i>pitch</i>	<i>stock</i>	new
	no. students	52	13	11	82	2	2	
	percentage	68.42%	17.11%	14.47%	95.35%	2.33%	2.33%	
3		<i>stark</i>	<i>pouring</i>	<i>soaking</i>	<i>stark</i>	<i>pouring</i>	<i>soaking</i>	wet
	no. students	14	21	44	7	19	60	
	percentage	17.72%	26.58%	55.70%	8.14%	22.09%	69.77%	
4		<i>dead</i>	<i>crystal</i>	<i>mirror</i>	<i>dead</i>	<i>crystal</i>	<i>mirror</i>	clear
	no. students	15	51	11	9	69	9	
	percentage	19.48%	66.23%	14.29%	10.34%	79.31%	10.34%	
5		<i>world</i>	<i>brand</i>	<i>country</i>	<i>world</i>	<i>brand</i>	<i>country</i>	wide
	no. students	52	18	8	77	7	1	
	percentage	66.67%	23.08%	10.26%	90.59%	8.24%	1.18%	
6		<i>blind</i>	<i>fast</i>	<i>rock</i>	<i>blind</i>	<i>fast</i>	<i>rock</i>	drunk
	no. students	27	45	7	41	29	17	
	percentage	34.18%	56.96%	2.95%	47.13%	33.33%	19.54%	
7		<i>sheet</i>	<i>dead</i>	<i>paper</i>	<i>sheet</i>	<i>dead</i>	<i>paper</i>	thin
	no. students	28	3	48	16	2	69	
	percentage	35.44%	3.80%	60.76%	18.39%	2.30%	79.31%	
8		<i>razor</i>	<i>blade</i>	<i>pitch</i>	<i>razor</i>	<i>blade</i>	<i>pitch</i>	sharp
	no. students	56	17	6	50	28	8	
	percentage	70.89%	21.52%	7.59%	58.14%	32.56%	9.30%	
9		<i>dirt</i>	<i>wide</i>	<i>rock</i>	<i>dirt</i>	<i>wide</i>	<i>rock</i>	awake
	no. students	23	44	11	6	77	4	
	percentage	28.40%	54.32%	13.58%	6.90%	88.51%	4.60%	
10		<i>dead</i>	<i>bone</i>	<i>crystal</i>	<i>dead</i>	<i>bone</i>	<i>crystal</i>	easy
	no. students	30	46	3	65	19	3	
	percentage	37.97%	58.23%	3.80%	74.71%	21.84%	3.45%	

the normalized frequency of the particular intensifying compound in the reference corpus, we found a significant correlation between the learners' knowledge of the English IACs and the normalized frequency of the compound ($p = 0.087^{**}$, $p = 0.000$, $n = 1679$; separated per condition: non-CLIL $p = 0.096^{**}$, $p = 0.007$, $n = 800$; CLIL $p = 0.082^{**}$, $p = 0.015$, $n = 879$). This result suggests that the frequency of the item (with the frequency in the reference corpora as a proxy of the input frequency) is related to a more or less successful acquisition of the particular compound.

5.1.2. Dutch

Table 9 shows the descriptive statistics. As in TL English, in TL Dutch the CLIL students chose significantly more idiomatic combinations compared with the non-CLIL students ($U = 2667.5$, $z = -6.34$, $p > .05$, $r = -0.432$; medium effect size) (Table 9).

Figure 2 shows that, as in English, the greatest number of non-CLIL students (the peak in the histogram) is situated lower on the scale compared with the CLIL students. More specifically, 27 non-CLIL students identified only 3 out of 10 IACs, while 35 CLIL students identified 6 out of 10 IACs.

In TL Dutch, we observe fewer idiomatic choices overall than in TL English. However, also in TL Dutch, the CLIL students recognize idiomatic combinations more frequently than the non-CLIL students do (Table 10).

Of all the Dutch intensifying compounds under study, *muisstil* 'lit. mouse-quiet' is the item that the CLIL learners identified most frequently (79.10%). For the non-CLIL students, it is the second most frequently identified item (48.24%). This is probably due to the fact that the compound is semantically relatively transparent, it is frequent, and the distractors *snik* 'sob/someone's last breath' and *aal* 'eel' would not form transparent compounds with *stil* 'quiet'.

The compound *peperduur* 'lit. pepper-expensive' is the second most frequently recognized by the CLIL students (70.15%). For the non-CLIL students it was much harder (36.05%). It is a frequent compound, and although it is non-transparent, the fact that the distractors would not form transparent combinations with *duur* 'expensive' either (*spiksplinter* 'spike-splinter' and *laaiend duur* 'furiously expensive') may explain why it turned out to be the second easiest combination for the CLIL students.

The compounds that were hardest for both learner groups are *bloedheet*, *stokoud* and *spekglad*. Despite its relative frequency, the compound *bloedheet* 'lit. blood-hot' (recognized by 30.60% of the CLIL students and 32.94% of the non-CLIL students) is possibly more difficult because it is non-transparent, and relatively informal. The distractors (*pik* 'pitch', *steen* 'stone') would not have formed a transparent combination either. The compound *stokoud* 'lit. stick-old' (recognized by 22.22% of the CLIL students and 28.09% of the non-CLIL students) is also relatively frequent but non-transparent, and the distractors *piep* 'beep' and *steen* 'stone' are not transparent either. The hardest combination for the learners is *spekglad* 'lit. fat-slippery', with only 15.67% of the CLIL students and 16.47% of the non-CLIL students able to recognize it, probably because it is non-transparent and infrequent. Moreover, most of the learners chose the distractor *ijs* 'ice', which would have formed a semantically transparent combination with *glad* 'slippery', in contrast to *spek* 'fat'.

Table 9. Descriptive statistics of the proportion of idiomatic choices in the Dutch multiple-choice test – based on individual proportions.

	Non-CLIL Dutch	CLIL Dutch
<i>n</i>	89	134
Mean	0.32	0.50
Median	0.3	0.5
St. dev.	0.15	0.17

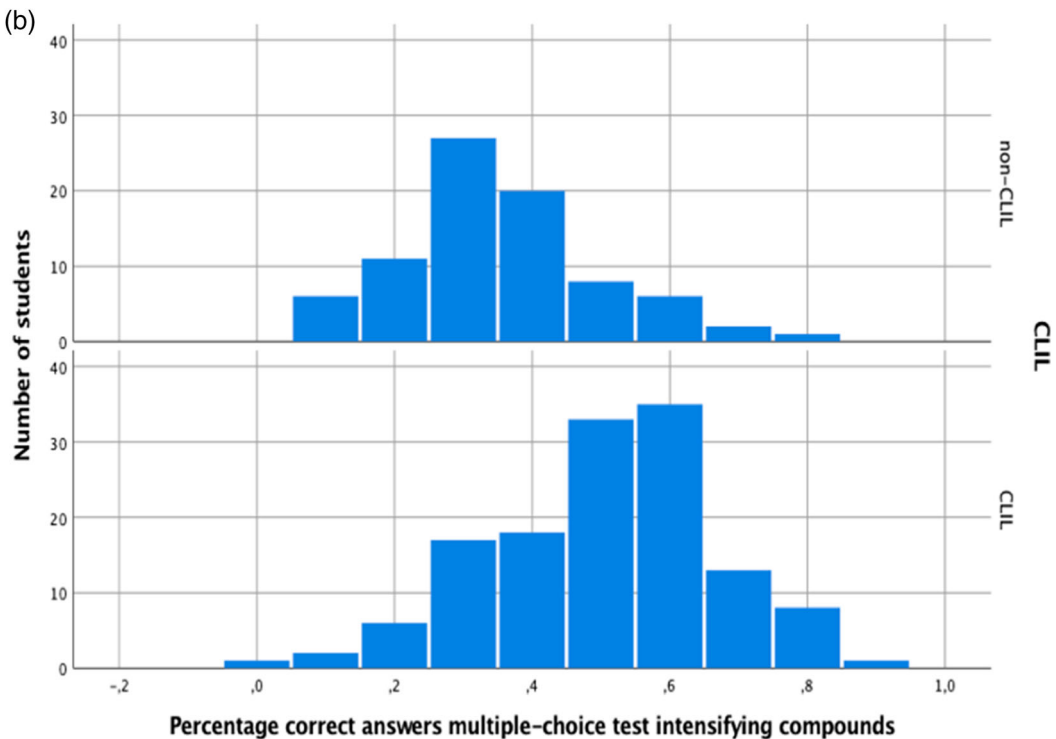


Figure 2. Proportion of idiomatic choices in the multiple-choice test on Dutch compounds.

Table 10. Proportions of idiomatic choices per item in the Dutch multiple-choice test – based on group proportions.

		Non-CLIL			CLIL			
<i>n</i>		89			135			
1		<i>stok</i>	<i>piep</i>	<i>steen</i>	<i>stok</i>	<i>piep</i>	<i>steen</i>	<i>oud</i>
	no. students	25	24	40	30	49	56	
	percentage	28.09%	26.97%	44.94%	22.22%	36.30%	41.48%	
2		<i>steen</i>	<i>bloed</i>	<i>pik</i>	<i>steen</i>	<i>bloed</i>	<i>pik</i>	<i>heet</i>
	no. students	22	28	35	16	41	77	
	percentage	25.88%	32.94%	41.18%	11.94%	30.60%	57.46%	
3		<i>stok</i>	<i>ijs</i>	<i>spek</i>	<i>stok</i>	<i>ijs</i>	<i>spek</i>	<i>glad</i>
	no. students	23	48	14	28	85	21	
	percentage	27.06%	56.47%	16.47%	20.90%	63.43%	15.67%	
4		<i>kei</i>	<i>gloeïend</i>	<i>oer</i>	<i>kei</i>	<i>gloeïend</i>	<i>oer</i>	<i>hard</i>
	no. students	31	36	19	90	30	13	
	percentage	36.05%	41.86%	22.09%	67.67%	22.56%	9.77%	
5		<i>spik splinter</i>	<i>laaiend</i>	<i>peper</i>	<i>spik splinter</i>	<i>laaiend</i>	<i>peper</i>	<i>duur</i>
	no. students	22	35	29	21	19	94	
	percentage	25.58%	40.70%	33.72%	15.67%	14.18%	70.15%	
6		<i>aal</i>	<i>muis</i>	<i>snik</i>	<i>aal</i>	<i>muis</i>	<i>snik</i>	<i>stil</i>
	no. students	24	41	20	20	106	8	
	percentage	28.24%	48.24%	23.53%	14.93%	79.10%	5.97%	
7		<i>ei</i>	<i>toren</i>	<i>pijl</i>	<i>ei</i>	<i>toren</i>	<i>pijl</i>	<i>snel</i>
	no. students	17	33	36	18	32	82	
	percentage	19.77%	38.37%	41.86%	13.64%	24.24%	62.12%	
8		<i>roet</i>	<i>schat</i>	<i>honds</i>	<i>roet</i>	<i>schat</i>	<i>honds</i>	<i>rijk</i>
	no. students	27	35	20	58	58	16	
	percentage	32.93%	42.68%	24.39%	43.94%	43.94%	12.12%	
9		<i>spuug</i>	<i>barstens</i>	<i>bere</i>	<i>spuug</i>	<i>barstens</i>	<i>bere</i>	<i>sterk</i>
	no. students	28	20	37	39	71	14	
	percentage	32.94%	23.53%	43.53%	17.91%	29.10%	52.99%	
10		<i>beeld</i>	<i>ziels</i>	<i>ape</i>	<i>beeld</i>	<i>ziels</i>	<i>ape</i>	<i>schoon</i>
	no. students	37	29	18	84	35	14	
	percentage	44.05%	34.52%	21.43%	63.16%	26.32%	10.53%	

Again, the frequency of the IACs in a reference corpus appears to be positively correlated to the number of idiomatic choices, at least in the case of the CLIL students (CLIL $\rho = 0.153^{**}$, $p = 0.000$, $n = 1350$). The insignificant correlation between the frequency of the compound and the number of idiomatic choices in the case of the non-CLIL students ($\rho = 0.003$, $p = 0.932$, $n = 890$) is probably due to the fact that most non-CLIL students were unable to identify the IACs in the multiple-choice test. The results for the CLIL students are in line with the English results, and once more these findings suggest that items that occur relatively more frequently may be acquired more easily. Possibly the non-CLIL students did not encounter enough IACs in their TL input to reach the same proficiency as the CLIL students.

In the next sections, we will first analyze the correlations between the predictors and the outcome variable (5.2.), and will then model the effect of the different predictors on the outcome variable in linear regression models (5.3.).¹²

5.2. Correlations between the predictor and outcome variables

5.2.1. English

To analyze the strength of association between the TL exposure and vocabulary knowledge scores on the one hand, and the proportion of idiomatic choices in the multiple-choice test on the other, we ran Spearman correlations for each of the TLs separately (see Table 11 for TL English, and Table 12 for TL Dutch). In Appendix A2, we provide a table with the correlations between the predictors.

As we can see from Table 11, CLIL, current informal contact with the TL, and the number of years of TL instruction correlate significantly with the proportion of idiomatic choices in the multiple-choice test. Furthermore, the receptive vocabulary (PPVT-IV) and the productive vocabulary (MTLD) scores

Table 11. Correlations between predictor and outcome variables for English.

	Receptive knowledge of IACs	<i>p</i>
CLIL	0.490**	0.000
Current informal contact with the TL	0.251**	0.001
Number of years of TL instruction	0.242**	0.001
PPVT-IV (receptive vocabulary knowledge)	0.576**	0.000
MTLD (sixth year written productions)	0.543**	0.000

* $p < .05$ (two-tailed).** $p < .01$ (two-tailed).**Table 12.** Correlations between predictor and outcome variables for Dutch.

	Receptive knowledge of IACs	<i>p</i>
CLIL	0.423**	0.000
Current informal contact with the TL	0.263**	0.000
Number of years of TL instruction	0.275**	0.000
PPVT-III-NL (receptive vocabulary knowledge)	0.452**	0.000
MTLD (sixth year written productions)	0.314**	0.000

* $p < .05$ (two-tailed).** $p < .01$ (two-tailed).

also correlate significantly with the learners' receptive knowledge of IACs. Taken together, the correlations presented here lead us to believe that besides the expected effect of CLIL, the proposed TL-input measures and the vocabulary-knowledge measures are also positively associated with the learners' receptive knowledge of English IACs.

5.2.2. Dutch

Table 12 shows the correlations (Spearman's rho coefficients) between the outcome measure and the independent variables for the Dutch texts.

As can be observed in Table 12, while the correlation coefficients and, hence, the strength of the correlations for these Dutch measures are somewhat lower than in English, the overall picture shows similar tendencies: all input and vocabulary variables correlate significantly with the proportion of idiomatic choices in the multiple-choice test in Dutch.

5.3. Regression analyses

5.3.1. English

In order to gauge the relative effects of the different predictors on the students' receptive knowledge of IACs, we conducted multiple hierarchical regression analyses (forced entry), the results of which are presented below. All assumptions required for this type of statistical analysis were met.¹³

Table 13 shows the outcomes of the regression model for the English learners. It includes the TL exposure variables in the first block (the number of years of TL instruction and the current informal 'input/use' outside school), the vocabulary variables in a second block (the receptive vocabulary knowledge (PPVT-IV), and the proxy measure for productive vocabulary (MTLD)), and finally CLIL in a third block, the aim being to test whether CLIL still has an effect if it is isolated from all the other variables.

In the first block, the relationship between the TL exposure measures and the learners' receptive knowledge of IACs is measured. Both the number of years of TL instruction and the current informal use of the TL outside school are positively correlated with the learners' receptive knowledge of IACs in a significant way.

In the second block, the vocabulary measures are included in the regression model alongside the TL exposure measures. Both the learners' receptive vocabulary (PPVT-IV) and the learners' productive vocabulary (MTLD) are significantly associated with the learners' receptive knowledge of IACs. The

Table 13. Regression model of the effect of different types of TL exposure and vocabulary knowledge on the percentage of idiomatic choices in the multiple-choice test of English IACs.

English (<i>N</i> = 144)	<i>B</i>	<i>SE B</i>	β	VIF	<i>p</i>
<i>Block 1</i>					
(Constant)	0.387	0.069			0.000
Number of years TL instruction**	0.018	0.006	0.228	1.044	0.006
Current informal contact with TL*	0.051	0.020	0.202	1.044	0.014
<i>Block 2</i>					
(Constant)	0.054	0.072			0.452
Number of years TL instruction	0.005	0.005	0.068	1.144	0.339
Current informal contact with TL	0.008	0.018	0.031	1.152	0.665
PPVT-IV**	0.002	0.000	0.353	1.330	0.000
MTLD**	0.004	0.001	0.343	1.243	0.000
<i>Block 3</i>					
(Constant)	0.031	0.071			0.658
Number of years TL instruction	0.005	0.005	0.070	1.144	0.316
Current informal contact with TL	0.002	0.018	0.007	1.172	0.923
PPVT-IV**	0.001	0.000	0.249	1.703	0.004
MTLD**	0.004	0.001	0.320	1.262	0.000
CLIL*	0.090	0.034	0.212	1.538	0.010

Note: $R^2 = 0.112$, $F(1,143) = 8.883$ for Block 1. $\Delta R^2 = 0.274$, $F(3,143) = 21.864$ for Block 2. $\Delta F = 31.058$ ($p < .001$)** $p = 0.000$. $\Delta R^2 = 0.029$, $F(4,143) = 19.620$ for Block 3. $\Delta F = 6.918$ ($p < .001$)** $p = 0.000$.

vocabulary measures correlate relatively more strongly with the learners' receptive knowledge of IACs than the TL exposure measures. As a result, the TL exposure measures no longer contribute significantly to the model, once the vocabulary measures are included in the regression model.

The results in the third block indicate that, isolated from the effects of the other predictor variables (the TL exposure variables and the variables of vocabulary knowledge), the CLIL variable still appears to have a significant effect on the learners' receptive knowledge of IACs ($\beta = 0.212$). Alongside CLIL, both the vocabulary variables are significantly related to the learners' receptive knowledge of IACs – the learners' productive vocabulary (MTLD) ($\beta = 0.320$) more strongly than the learners' receptive vocabulary ($\beta = 0.249$). In other words, the variables of CLIL and receptive and productive vocabulary knowledge correlate more strongly with the learners' receptive knowledge of IACs, compared with the students' current informal contact with the TL, and the number of years of TL instruction.

The final model explains 41.6% of the variance ($R^2 = 0.416$, adjusted $R^2 = 0.394$), which can be regarded as a relatively high predictive power (Plonsky and Ghanbar 2018). However, it also means that other factors may also contribute to the learners' receptive knowledge of IACs.

5.3.2. Dutch

We observe rather different tendencies in the regression model including the different types of TL exposure, the vocabulary variables and CLIL, as predictors of the percentage of idiomatic choices in the multiple-choice test of Dutch IACs (See Table 14).

In the regression model for Dutch, we observe that, when only the TL exposure measures are considered (in block 1), both significantly contribute to the model. However, once the vocabulary measures are introduced (in block 2), the number of years of TL instruction no longer contributes significantly, and neither does the proxy variable for productive vocabulary use (MTLD). Conversely, current informal contact with Dutch ($\beta = 0.169$) and the receptive vocabulary knowledge ($\beta = 0.235$) are significant predictors of the learners' receptive knowledge of IACs.

In contrast to the model for English, CLIL does not significantly contribute to the model if the model also includes the vocabulary and exposure variables to predict the learners' receptive knowledge of Dutch IACs. This is probably related to the fact that receptive vocabulary knowledge (PPVT-III-NL) and CLIL correlate quite strongly ($\rho = 0.628^{**}$, see Appendix A2). Although this does not imply a violation of the assumption of perfect multicollinearity ($VIF > 1 < 10$), it makes the model harder to

Table 14. Regression model of the effect of different types of TL exposure and vocabulary knowledge on the percentage of idiomatic choices in the multiple-choice test of Dutch IACs.

Dutch (<i>N</i> = 179)	<i>B</i>	<i>SE B</i>	β	VIF	<i>p</i>
<i>Block 1</i>					
(Constant)	0.215	0.049			0.000
Number of years TL instruction*	0.012	0.005	0.181	1.110	0.016
Current informal contact with TL*	0.057	0.016	0.259	1.110	0.001
<i>Block 2</i>					
(Constant)	0.033	0.059			0.577
Number of years TL instruction	0.006	0.005	0.088	1.190	0.224
Current informal contact with TL*	0.038	0.016	0.175	1.191	0.016
PPVT-III-NL**	0.002	0.000	0.310	1.366	0.000
MTLD	0.001	0.001	0.091	1.357	0.237
<i>Block 3</i>					
(Constant)	0.021	0.059			0.717
Number of years TL instruction	0.005	0.005	0.076	1.201	0.292
Current informal contact with TL*	0.037	0.016	0.169	1.194	0.020
PPVT-III-NL*	0.001	0.001	0.235	1.792	0.008
MTLD	0.001	0.001	0.066	1.405	0.396
CLIL	0.054	0.031	0.150	1.705	0.083

Note: $R^2 = 0.129$, $F(1,178) = 13.052$ for Block 1, $\Delta R^2 = .110$ $F(3, 178) = 13.709$ for Block 2. $\Delta F = 12.640$ ($p < .001$)** $p = 0.000$. $\Delta R^2 = 0.013$, $F(4, 178) = 11.706$ for Block 3. $\Delta F = 3.047$ ($p < .001$)** $p = 0.000$.

interpret. From Table 12 with simple correlations (cf. Section 5.2.2.), we concluded that both CLIL and receptive vocabulary knowledge are significantly correlated with the learners' receptive knowledge of IACs. The findings from the regression model suggest that the variable of receptive vocabulary knowledge (PPVT-III-NL) explains the variance that CLIL could account for if it were the only predictor variable in the regression model. Since receptive vocabulary knowledge of IACs can be regarded as a part of overall receptive vocabulary knowledge, it does not come as a surprise that receptive vocabulary knowledge can explain more of the variance than CLIL. Attempting to interpret this finding, we can only note that these three variables are highly correlated, but we cannot make any claims about the causality of these relationships. However, we hypothesize that CLIL is the underlying predictor: in other words, that the CLIL students have a greater receptive vocabulary thanks to CLIL, and that this large receptive vocabulary predicts their higher scores on the multiple-choice test on the IACs.

Lastly, we observe that the percentage of variance for which the model can account is much lower for TL Dutch than for TL English, namely 25.3% ($R^2 = 0.253$, adjusted $R^2 = 0.231$).

6. Conclusion

In this study, we focused on CLIL and non-CLIL students' receptive knowledge of intensifying compounds.

Before discussing the main results, we acknowledge that this study has some limitations. One involves the difficulty in covering all TL input the pupils receive, especially in the classroom. Our analysis included the number of years of target language learning, the effect of CLIL, and informal contact with the target language. However, a more qualitative analysis of intensifiers in the teaching materials or in the teachers' speech went beyond the scope of this study. The teachers' use of intensifiers is a variable that is particularly difficult to measure, for one reason because the students switch teachers and textbooks every year. In future studies, nevertheless, we hope to take this variable into account in our analyses, by means of a qualitative analysis of the teaching materials used by our sample of students and some videotaped classroom observations already at our disposal.¹⁴ Another limitation involves the differences between the multiple-choice tests in English and in Dutch. The English test contained one more transparent item than the Dutch test.

Despite these limitations, the study yielded some noteworthy results. The results of the multiple-choice test corroborate our hypothesis that, overall, the CLIL learners of both target languages

develop greater receptive knowledge of IACs. In addition, the IACs that are more frequent in the reference corpus – and hypothetically in the learners' input – are more likely to be recognized by the learners.

The difference between the CLIL and the non-CLIL learners' receptive knowledge of IACs is more prominent in Dutch than in English. Overall, the students with English as a TL (in CLIL and non-CLIL) show greater ability in completing the multiple-choice test in comparison to the learners of Dutch.

In addition, we analyzed whether other factors are associated with the receptive knowledge of IACs, besides CLIL. We expected that CLIL would still be positively associated with the acquisition of IACs, even if we disentangle the effect of this variable from the effects of other types of TL exposure, such as the number of years of TL instruction, and informal extracurricular contact with the TL. We also expected that a positive relationship would exist between the learners' receptive and productive vocabulary knowledge, and their receptive knowledge of IACs. All these predictors turned out to correlate significantly with the learners' receptive knowledge of IACs.

The regression analysis, however, pointed to different conclusions depending on the TL. In terms of the relative importance of the predicting variables in the regression model for English, we found that CLIL remains a significant predictor of the learners' receptive knowledge of IACs, even when including the TL exposure variables and the vocabulary variables as predictors of the learners' receptive knowledge of IACs. In addition, both vocabulary measures are significantly related to the learners' receptive knowledge of IACs in English as a TL.

In the regression model measuring the receptive knowledge of Dutch IACs, we found current informal contact with the TL and receptive vocabulary knowledge to be significant predictors. However, CLIL did not significantly contribute to the model. The observed differences in the effects of specific types of TL exposure is in line with the trends reported in our study of the effect of TL exposure on the overall writing ability of the learners (Van Mensel et al. [forthcoming](#)). At first sight, these are quite surprising results, since one would expect a comparable picture for both TL learning conditions, also given the fact that there are significant correlations between these input variables and the outcome variable both in Dutch and in English.

One possible explanation may lie in the distinct status of English and Dutch as TLs in French-speaking Belgium. English is considered the most important international language and is all-pervasive in everyday Belgian life through social media, music, television, etc. Consequently, most of the TL English learners in French-speaking Belgium are exposed to English outside the classroom, at least to a certain extent. As shown in Section 4.3.2.1, the English learners are at least 'sometimes' in contact with English outside school. By contrast, the learners use Dutch (the non-international language of the Flemish language community in Belgium) less often in informal extracurricular contexts. For this reason, 'current informal contact' may have a greater impact on the acquisition of TL Dutch: the students who are exposed to Dutch in extracurricular contexts would encounter significant benefits from this extra input. This finding would be counterbalanced for TL English, as all TL English learners are exposed to English in extracurricular contexts, at least to a certain extent.

All in all, we can conclude that the acquisition of IACs is significantly related to overall vocabulary acquisition, which is in line with results reported by Koya (2005) and Gyllstad (2007). For learners acquiring English, CLIL is a significant predictor as well, which means that it explains part of the variance in the learners' knowledge of IACs that is not explained by their vocabulary knowledge alone. For learners of Dutch, informal contact with the TL outside school is a significant predictor besides vocabulary knowledge. On the one hand, these additional variables related to CLIL and extracurricular input indicate that the acquisition of IACs is not just an effect of vocabulary learning, and that exposure is needed for learners to identify specific collocations, also at the word-formation level. This finding underlines the importance of helping students expand their target language vocabulary. On the other hand, the different findings for the two TLs indicate that SLA research in general and research on SLA in CLIL specifically may benefit from a contrastive analysis in which learners that share the same L1 but are learning different TLs are compared. This kind of contrastive analysis can inform us about the contextual factors that may complicate the acquisition of specific TLs.

Notes

1. This work was supported by a Coordinated Research Project grant (ARC 14/19-061) from the Université catholique de Louvain (UCLouvain) and the Université de Namur (UNamur), awarded to Philippe Hilgsmann (spokesperson; UCLouvain), Benoît Galand (UCLouvain), Laurence Mettwie (UNamur), Fanny Meunier (UCLouvain), Arnaud Szmalec (UCLouvain), and Kristel Van Goethem (F.R.S-FNRS & UCLouvain). We would like to thank Amélie Bulon, Audrey De Smet, Luk Van Mensel, and Morgane Simonis for their assistance in data collection, as well as Emmanuella Ahishakiye, Natacha Buntinx, Mathilde Dumont, Laura Nolevaux, Heloise Pierret and Leticia Raemdonck for helping us organize and transcribe the data. We also warmly thank the schools and students that took part in the study.
2. This is different from the situation in other countries, e.g. Germany (Rumlich 2016) or the Netherlands (Maljers 2007).
3. Socio-affective variables and cognitive variables may also have an impact on the learners' knowledge of IACs, but considering these variables goes beyond the scope of this article. However, these variables are analyzed in detail in (De Smet et al. 2019 and Simonis et al. forthcoming a in this special issue).
4. Note that the studies by Arnaud and Savignon (1997) and Bahns and Eldaw (1993) pre-date the corpus revolution. The classification of 'collocations' in these studies may be less reliable than the later studies by Koya (2005) and Gyllstad (2007), as there was no access to bigrams yet.
5. The index, established in 2011 by the education authorities, is based on a number of socio-economic criteria related to the neighborhood in which the students of a particular school reside. URL: www.gallilex.cfwb.be/document/pdf/36474_000.pdf.
6. LimeSurvey: <https://www.limesurvey.org/about-limesurvey/team-contributors> (team: Schmitz, Gac, Härstedt, Flür, Kondziella, Chiritoiu).
7. http://corpora.uni-leipzig.de/en?corpusId=eng-uk_web_2002.
8. http://corpora.uni-leipzig.de/en?corpusId=nld_web_2002.
9. We used a test of receptive vocabulary of Standard American English, while the reference corpus is based on British English. However, we checked the IACs of our English test in British and American dictionaries and made sure that they occurred in both varieties. The IACs in the Dutch test also occur in both Flemish Dutch and Netherlandic Dutch. We were unable to control for the variety of Dutch or English (if only one) that was taught to the students.
10. The target-language input is not limited to teaching materials, and also includes the oral productions of the teachers(s) and other students, and even target-language contact outside the classroom (see Van Mensel et al. forthcoming). Considering all these types of input and their relative effect on target-language acquisition of intensification goes beyond the scope of this study.
11. Koizumi (2012) found that MTLD was least affected by text length compared with TTR and other recent indices (e.g. Guiraud index and D), when used with texts of at least 100 tokens.
12. We used SPSS version 24 for the statistical analysis.
13. First, the predictors showed some variation in value, which is in line with the assumption of non-zero variance. Second, there was no perfect multicollinearity between two or more of the predictors (VIF scores are $> 1 < 10$). Third, the assumption of independent errors was fulfilled. The residuals are only slightly positively correlated in the regression models for TL English (Durbin-Watson = 1.835) and TL Dutch (Durbin-Watson = 1.636). Fourth, we plotted the regression standardized residual against the regression standardized predicted value in a scatter plot. The points are randomly and evenly dispersed throughout the plot, hence the assumptions of linearity and homoscedasticity are met. Fifth, the residuals are normally distributed. Sixth, the assumption of independence is also met – each value of the outcome variable comes from a different student. Seventh, the assumption of linearity was fulfilled because the scatter plot showed a linear relationship rather than any other.
14. Note that there is little research on TL input in CLIL. To our knowledge, Moller (2017) is the only study so far that has analyzed CLIL teaching materials.
15. We included spelling variations in the searches, such as *brandnew* and *brand new*.

Disclosure statement

No potential conflict of interest was reported by the authors.

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Appendices

Appendix A1. Multiple-choice test IACs (English/Dutch)

English

1. The temperature was ... cold.
 - a. ice
 - b. stone
 - c. frost
2. My clothes are ... new.
 - a. brand
 - b. pitch
 - c. stock
3. My coat is ... wet.
 - a. stark
 - b. pouring
 - c. soaking
4. The message is ... clear.
 - a. dead
 - b. crystal
 - c. mirror
5. She has a ... wide influence.
 - a. world
 - b. brand
 - c. country
6. He was ... drunk and behaved really badly.
 - a. blind
 - b. fast
 - c. rock
7. These walls are ... thin. You can hear everything said in the next room.
 - a. sheet
 - b. dead
 - c. paper
8. Be careful with that knife – it's ... sharp.
 - a. razor
 - b. blade
 - c. pitch
9. I was ... awake by six.
 - a. dirt
 - b. wide
 - c. rock
10. That exam was ... easy. I've certainly passed.
 - a. dead
 - b. bone
 - c. crystal

Dutch

1. Grootvader is ... oud. 'Grandfather is ... old.'
 - a. stok
 - b. piep
 - c. steen
2. De soep is ... heet. 'The soup is ... hot.'
 - a. steen
 - b. bloed
 - c. pik
3. De ijsbaan is ... glad. 'The ice rink is ... slippery.'
 - a. stok
 - b. ijs
 - c. spek

4. Het bankje was ... hard. 'The bench was ... hard.'
 - a. kei
 - b. gloeiend
 - c. oer
5. Mijn computer was ... duur. 'My computer was ... expensive.'
 - a. spiksplinter
 - b. laaiend
 - c. peper
6. Tijdens de les was het ... stil. 'During the class it was ... quiet.'
 - a. aal
 - b. muis
 - c. snik
7. Hij rende ... snel naar de finish. 'He ran ... fast to the finish line.'
 - a. ei
 - b. toren
 - c. pijl
8. Later word ik hopelijk ... rijk. 'Later I will hopefully become ... rich.'
 - a. roet
 - b. schat
 - c. honds
9. Mijn vader is ... sterk. 'My father is ... strong.'
 - a. spuug
 - b. barstens
 - c. bere
10. Het uitzicht is ... schoon. 'The view is ... beautiful.'
 - a. beeld
 - b. ziels
 - c. ape

Table A1. Correlations between variables in English.

		CLIL	Percentage idiomatic IACs	Current input	Productive vocabulary knowledge	No. of years TL learning	Receptive vocabulary knowledge
CLIL	Cor. coefficient	1.000	0.490**	0.240**	0.338**	0.145	0.594**
	Sig. (2-tailed)	–	0.000	0.001	0.000	0.052	0.000
	<i>n</i>	180	150	179	144	180	180
Percentage idiomatic IACs	Cor. coefficient	0.490**	1.000	0.251**	0.543**	0.242**	0.576**
	Sig. (2-tailed)	0.000	–	0.002	0.000	0.003	0.000
	<i>n</i>	150	150	150	144	150	150
Current input	Cor. coefficient	0.240**	0.251**	1.000	0.264**	0.060	0.231**
	Sig. (2-tailed)	0.001	0.002	–	0.001	0.425	0.002
	<i>n</i>	179	150	179	144	179	179
Productive vocabulary knowledge	Cor. coefficient	0.338**	0.543**	0.264**	1.000	0.271**	0.432**
	Sig. (2-tailed)	0.000	0.000	0.001	–	0.001	0.000
	<i>n</i>	144	144	144	144	144	144
No. of years TL learning	Cor. coefficient	0.145	0.242**	0.060	0.271**	1.000	0.312**
	Sig. (2-tailed)	0.052	0.003	0.425	0.001	–	0.000
	<i>n</i>	180	150	179	144	180	180
Receptive vocabulary knowledge	Cor. coefficient	0.594**	0.576**	0.231**	0.432**	0.312**	1.000
	Sig. (2-tailed)	0.000	0.000	0.002	0.000	0.000	–
	<i>n</i>	180	150	179	144	180	180

Appendix A2. Correlations between predictor and outcome variables**Table A2.** Correlations between variables in Dutch.

		CLIL	Percentage idiomatic IACs	Current input	Productive vocabulary knowledge	No. of years TL learning	Receptive vocabulary knowledge
CLIL	Cor. coefficient	1.000	0.423**	0.303**	0.460**	0.325**	0.628**
	Sig. (2-tailed)	–	0.000	0.000	0.000	0.000	0.000
	<i>n</i>	225	188	218	186	225	225
Percentage idiomatic IACs	Cor. coefficient	0.423**	1.000	0.263**	0.314**	0.275**	0.452**
	Sig. (2-tailed)	0.000	–	0.000	0.000	0.000	0.000
	<i>n</i>	188	188	182	185	188	188
Current input	Cor. coefficient	0.303**	0.263**	1.000	0.268**	0.234**	0.296**
	Sig. (2-tailed)	0.000	0.000	–	0.000	0.000	0.000
	<i>n</i>	218	182	218	180	218	218
Productive vocabulary knowledge	Cor. coefficient	0.460**	0.314**	0.268**	1.000	0.265**	0.487**
	Sig. (2-tailed)	0.000	0.000	0.000	–	0.000	0.000
	<i>n</i>	186	185	180	186	186	186
No. of years TL learning	Cor. coefficient	0.325**	0.275**	0.234**	0.265**	1.000	0.355**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	–	0.000
	<i>n</i>	225	188	218	186	225	225
Receptive vocabulary knowledge	Cor. coefficient	0.628**	0.452**	0.296**	0.487**	0.355**	1.000
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	–
	<i>n</i>	225	188	218	186	225	225